

FUERTESIMALVA, A NEW GENUS OF NEOTROPICAL MALVACEAE

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ABSTRACT

Urocarpidium sect. *Urocarpidium* is shown to be synonymous with the genus *Tarasa*, and *Urocarpidium* sect. *Anurum* is generically distinct. The latter is redescribed in generic rank and given the name *Fuertesimalva*. Fourteen new combinations are made.

RESUMEN

Urocarpidium sect. *Urocarpidium* es un sinónimo del género *Tarasa*, y *Urocarpidium* sect. *Anurum* es considerado como un género distinto. Este último se redescrive en el rango generico con el nombre de *Fuertesimalva*. Se proponen catorce combinaciones nuevas.

The genus *Urocarpidium* was established by Ulbrich (1916) with the single species *U. albiflorum* Ulbrich. It was subsequently enlarged to include ten other species (Krapovickas 1954a), and ultimately a total of 14 species (Krapovickas 1970). The same number of species is recognized in the following enumeration, although with some nomenclatural changes (e.g., Fryxell & Krapovickas 1990; Krapovickas & Fryxell 1993) and the addition of more recently described species. Krapovickas (1954a) divided the genus into two sections, sect. *Urocarpidium* containing only the type species, and sect. *Anurum* Krapov., including the remaining species. This interpretation has been followed by most subsequent authors (e.g., Hutchinson 1967).

The etymology of the generic name *Urocarpidium* is considered problematical inasmuch as Ulbrich did not state his intention in proposing it. A reconsideration of its derivation led to a reconsideration of its taxonomy. Fryxell (1988) cited the roots of the name as the German "ur" (primitive) and the Latin "carpidium" from the Greek "karpos" (fruit) with a diminutive ending, thus meaning primitive mericarp. This is a plausible derivation, if one considers the relatively unornamented fruits that are typical of most of the species. However, an alternative derivation (Fuertes 1989) is from the Greek "ouro" (tail) plus "carpidium," meaning tailed (or aristate) mericarp. This interpretation was earlier rejected (Fryxell 1988) because the mericarps typical of these plants are not tailed or aristate. However, the question concerns the nature of the mericarps of the type species, *U. albiflorum*, the only species that Ulbrich knew when he described and named

the genus. The mericarp of this species was described by Ulbrich (1916) as "apice cauda longissima ad fere 8 mm longa ciliata munita" and was illustrated by Krapovickas (1954a) from an isotype specimen (PERU, mountains near Chosica, A. *Weberbauer* 5326, ISOTYPE: GH). A reconsideration of the mericarp morphology of *U. albiflorum* makes it clear that this species has aristate, pubescent mericarps and thus belongs in the genus *Tarasa* Phil. (and incidentally that the derivation given by Fuertes is correct). In fact, the mericarps of *U. albiflorum* (cf. Krapovickas 1954a, fig. 2A) conform closely to those of *Tarasa operculata* (Cav.) Krapov. (cf. Krapovickas 1954b, fig. 2A), and the former should perhaps be reduced to a synonym of the latter. In any case, *Urocarpidium* is to be treated as a synonym of *Tarasa*, and the remaining species, which are usually placed in *Urocarpidium*, form a natural genus that is lacking a name. It is the purpose of this note to describe the new genus and to supply a new name and make the necessary new combinations.

Fuertesimalva Fryxell, gen. nov. TYPE: *Fuertesimalva limensis* (L.) Fryxell ($\equiv$ *Malva limensis* L.)

Urocarpidium Ulbr. sect. *Anurum* Krapov. Darwiniana 10:614. 1954. LECTOTYPE, here designated: *Urocarpidium limense* (L.) Krapov. ($\equiv$ *Malva limensis* L.).

Herbae stellato-pubescentes, cymis axillaribus scorpioideis et corollis purpurascensibus et fructibus glabris, mericarpis singularis plus minusve hippocrepiformibus, necnon muticis atque irregulariter transversim rugatis, rugis paucis.

Annual or perennial herbs, ascending or erect, with stellate pubescence. Leaves petiolate, the blades ovate or orbicular, usually palmately lobed or parted, crenate or dentate, the upper surface sometimes with appressed simple hairs. Flowers sometimes solitary, usually in axillary scorpioid cymes; involucre of 2 or 3 filiform bractlets; calyx stellate-pubescent, (4–) 5-lobed; corolla purplish (sometimes white), shorter than to slightly longer than the calyx; androecium included, the column glabrous or pubescent, filamentiferous at apex, the anthers sometimes purple, few (sometimes only 5); styles 5–16, the stigmas capitate. Fruits schizocarpic, oblate, glabrous; mericarps 5–16, indehiscent, horseshoe-shaped, with irregular transverse ridges (these sometimes interlocking in the fruit between adjacent mericarps), sometimes with a small endoglossum; seeds solitary, glabrous.

Fuertesimalva is an Andean genus (Argentina and Chile to Colombia and Venezuela), with two species (*F. jacens* and *F. limensis*) found disjunctly in Mexico, usually from relatively high elevations (generally 1000–3800 m), but from much lower elevations (100–600 m) for *F. sanambrosiana* and *F. peruviana*. Keys to the species are found in Krapovickas (1954a, 1970), and a revised key is presented below. Chromosome numbers have been reported for several species (summarized by Krapovickas 1967, Tables 1 and 2, pp. 29, 34), with counts of $2n = 10, 20$, and 30 .

Fuertesimalva pertains to the *Sphaeralcea* alliance, i.e. those genera characterized by a base chromosome number of $x = 5$. Within this group it is one of the few genera characterized by axillary scorpioid inflorescences, which include *Tarasa* and, to a more limited extent, the genera *Monteiroa* and *Sphaeralcea*, the inflorescences of which conform to this pattern only imperfectly. The genera *Fuertesimalva* and *Tarasa* are very similar in leaf morphology and general aspect (as is evident from the plates published by Krapovickas 1954a, pl. 1–8), but are strikingly different in fruit morphology. The mericarps of *Fuertesimalva* are horseshoe-shaped, glabrous, and with characteristic transverse ridges or excrescences dorsally, in a pattern unlike that found in any other malvaceous genus. The mericarps of *Tarasa*, by contrast, are apically aristate, notably pubescent, and laterally reticulate, showing a superficial similarity to mericarps of *Sphaeralcea*. In addition, the two genera differ in pubescence characters, especially clearly presented in the case of calyx pubescence. *Fuertesimalva* pubescence is stellate (or sometimes with simple hairs) whereas that of *Tarasa* is commonly stipitate, with darkly pigmented stipes.

The results of cpDNA analysis by La Duke & Doebley (1995) show that *Urocarpidium* and *Tarasa* are not closely allied, in spite of sharing a common base chromosome number and a similar general aspect.

KEY TO THE SPECIES OF *FUERTESIMALVA*

1. Anthers 5(–7); flowers solitary or in few-flowered axillary inflorescences.
 2. Flowers always solitary.
 3. Carpels 5, the mericarps 1.5×1 mm; calyx and corolla pentamerous (Argentina). **F. pentacocca**
 3. Carpels 7–10, the mericarps 1.3×1.3 mm; petals often 3, the calyx usually 4-lobed [cf. Eliasson 1970] (Galápagos). **F. insularis**
 2. Flowers solitary or in few-flowered axillary inflorescences; carpels ca. 8, the mericarps 1.5×1.5 mm or larger (Argentina). **F. pentandra**
1. Anthers 10 or more; flowers generally in axillary scorpioid cymes.
 4. Stipules 5–10(–14) mm long, broadly ovate or falcate, ca. 5 mm wide; foliage subglabrous; carpels 12–15.
 5. Flowers sessile; calyx hirsute (Peru, Chile). **F. chilensis**
 5. Flowers pedicellate, the pedicels 2–3(–8) mm long; calyx with 1 or 2 setae (1.5 mm long) at tip of each lobe, otherwise glabrous (Peru). ... **F. stipulata**
 4. Stipules 2–6 mm long, linear-lanceolate, 0.5–2.5 mm wide; foliage generally pubescent; carpels 7–16.
 6. Petals 10 mm long; calyx 7–8 mm long, deeply divided, the lobes 6×2 mm; carpels 8–10; leaves basally truncate, unlobed (Peru). **F. leptocalyx**
 6. Petals 2–4(–7) mm long; calyx 4–6 mm long, ca. half-divided, the lobes shorter and broader; carpels 7–16; leaves often basally cordate, often palmately lobed.
 7. Mericarps 3×3 mm, ca. 10 (Peru). **F. pennellii**
 7. Mericarps usually 2.5×2.5 mm or smaller (or if larger, then only 8), 8–16.

- 8. Carpels 7–10; inflorescences 2–6-flowered.
 - 9. Inflorescences 2–3-flowered; mericarps 4.5×2.8 mm, apically acute (Peru). *F. corniculata*
 - 9. Inflorescences 2–6-flowered; mericarps 2.5×2.5 mm or smaller.
 - 10. Mericarps 1.5×1.5 mm (Colombia, Ecuador). *F. killipii*
 - 10. Mericarps 2×2 mm.
 - 11. Inflorescences subequal to the subtending leaf (Peru, Bolivia, Argentina). *F. echinata*
 - 11. Inflorescences generally shorter than the subtending petiole (Mexico). *F. jacens*
- 8. Carpels more than 10; inflorescences often with 10 flowers or more, often equalling or exceeding the subtending leaf.
 - 12. Mericarps lacking an endoglossum; plants of relatively high elevation (1400–3200 m) (Mexico, Venezuela, Colombia, Ecuador, Peru). *F. limensis*
 - 12. Mericarps with a small internal projection (endoglossum); plants of relatively low elevation (100–600 m).
 - 13. Mericarps black at maturity, 1.5–2 mm long (Peru, Chile). *F. peruviana*
 - 13. Mericarps pale brown at maturity, 1.2–1.5 mm long (Chile: Islas Desaventuradas). *F. sanambrosiana*

1. *Fuertesimalva chilensis* (A. Braun & Bouché) Fryxell, comb. nov.

Malva chilensis A. Braun & Bouché, Ind. Sem. Hort. Berol. 1. 1857. *Urocarpidium chilense* (A. Braun & Bouché) Krapov., Darwiniana 10:619. 1954. TYPE: CHILE, ex hort. Berolinensis (B as photo F-9322).

Malva scorpioides Turcz. Bull. Soc. Imp. Naturalistes Moscou 36:562. 1863. *Malvastrum peruvianum* var. *scorpioides* (Turcz.) E. G. Baker, J. Bot. 29:168. 1891. TYPE: PERU. LIMA: valley of Lima, A. Matthews 1006 (ISOTYPES: K, OXF).

Malvastrum hinkleyorum I. M. Johnst., Contr. Gray Herb. n.s. 70:73. 1924. TYPE: PERU. near Arequipa, 2100 m, Mar 1920, F. E. Hinkley & Mrs. Hinkley 43 (HOLOTYPE: GH; ISOTYPE: US).

Distribution.—Peru and Chile; 2100–2800 m elevation (0–3000 m fide Brako & Zarucchi 1993).

Illustrations.—Krapovickas (1954a, fig. 2F, pl. 3).

2. *Fuertesimalva corniculata* (Krapov.) Fryxell, comb. nov.

Urocarpidium corniculatum Krapov., Bonplandia 3: 67. 1970. TYPE: PERU. LIMA: Matucana (Valle de Rimac), 1000 m, 3 Apr 1967, M. Chanco 25 (HOLOTYPE: CTES).

Distribution.—Peru (Lima); 1000 m elevation (500–3000 m fide Brako & Zarucchi 1993).

Illustrations.—Krapovickas (1970, fig. 3A-B).

3. *Fuertesimalva echinata* (C. Presl) Fryxell, comb. nov.

Malva echinata C. Presl, Reliq. Haenk. 2:122. 1835. *Urocarpidium echinatum* (C. Presl) Krapov. & Fryxell, Bonplandia 7:58. 1993. TYPE: PERU. in Cordilleris Peruviae, T. Haenke s.n. (LECTOTYPE, designated by Krapovickas & Fryxell, loc. cit.: PR; ISOTYPE: PR).

Malvastrum shepardae I. M. Johnst. Contr. Gray Herb. n.s. 70:75. 1924. *Urocarpidium shepardae* (I. M. Johnst.) Krapov. Darwiniana 10:621. 1954. TYPE: PERU. PUNO: vicinity of Lake Titicaca, Dec. 1919, R. S. Shepard 123 (HOLOTYPE: GH).

Distribution.—Peru, Bolivia, Argentina (Salta, Tucumán); 2000–3800 m elevation (0–4500 m fide Brako & Zarucchi 1993).

Illustrations.—Krapovickas (1954a, fig. 2E, pl. 4).

4. *Fuertesimalva insularis* (Kearney) Fryxell, comb. nov.

Malvastrum insulare Kearney, Leaf. W. Bot. 6:167. 1952. *Urocarpidium insulare* (Kearney) Krapov. Darwiniana 10:631. 1954. TYPE: ECUADOR. GALAPAGOS ISLANDS: Albemarle (Isabella) Island, summit of Tagus Cove Mountain, 26 May 1932, J. T. Howell 9570 (HOLOTYPE: CAS).

Distribution.—Ecuador (Islas Galápagos); 1500–1600 m elevation (cf. Eliasson 1970).

Illustrations.—Bates (1971, fig. 190), Eliasson (1970, fig. 2), Krapovickas (1954a, fig. 2L).

5. *Fuertesimalva jacens* (S. Watson) Fryxell, comb. nov.

Malvastrum jacens S. Watson, Proc. Amer. Acad. Arts 21:417. 1886. *Urocarpidium jacens* (S. Watson) Krapov. Darwiniana 10:267. 1954. TYPE: MEXICO. CHIHUAHUA: Norogachic, 150 mi N of Batopilas, Aug–Nov 1885, E. Palmer 430 (LECTOTYPE, designated by Hill 1982: GH; ISOTYPES: K, US).

Malvastrum jacens var. *palmatifidum* Hochr., Annuaire Conserv. Jard. Bot. Genève 6:32. 1902. *Urocarpidium palmatifidum* (Hochr.) Krapov. Darwiniana 10:623. 1954. TYPE: MEXICO. CHIHUAHUA: in Sierra Madre, 2 Oct 1988, C. G. Pringle 1574 (HOLOTYPE: G; ISOTYPES: BM, BR, G, UC).

Distribution.—Mexico (Chihuahua to Chiapas; see map in Fryxell 1988, fig. 112); 2300–3000 m elevation.

Illustrations.—Fryxell (1988, fig. 113; 1992a, fig. 25), Krapovickas (1954a, fig. 2G–H).

6. *Fuertesimalva killipii* (Krapov.) Fryxell, comb. nov.

Urocarpidium killipii Krapov., Darwiniana 10:626. 1954. TYPE: COLOMBIA. SANTANDER: vicinity of Suratá, 1600–1800 m, 4–10 Jan 1927, E. P. Killip & A. C. Smith 16757 (HOLOTYPE: US; ISOTYPES: GH, NY).

Distribution.—Colombia (Santander) and Ecuador (Chimborazo, Imbabura, Pichincha, Tungurahua); 1600–2200 m elevation.

Illustrations.—Krapovickas (1954a, fig. 2K, fig. 3G–I, pl. 6).

7. *Fuertesimalva leptocalyx* (Krapov.) Fryxell, comb. nov.

Urocarpidium leptocalyx Krapov., Kurtziana 2:118. 1965. TYPE: PERU. ANCASH: prov. Santa Ana, 1700 m, 10 May 1960, A. Alza 11 (HOLOTYPE: LIL).

Distribution.—Peru (Ancash, Cajamarca); 1700–2100 m elevation.

Illustration.—Krapovickas (1965, fig. 3D–G).

8. *Fuertesimalva limensis* (L.) Fryxell, comb. nov.

Malva limensis L., Cent. Pl. 2:27. 1756; Amoen. Acad. 4:325. 1759. *Malvastrum limense* (L.) Ball, J. Linn. Soc., Bot. 22:32. 1885. *Malvastrum peruvianum* var. *limense* (L.) E. G. Baker, J. Bot. 29:168. 1891. *Urocarpidium limense* (L.) Krapov., Kurtziana 4:33. 1967. TYPE: "limensis" (HOLOTYPE: LINN-870.6).

Malva costata C. Presl, Reliq. Haenk. 2:123. 1835. TYPE: PERU. in collibus Cordillerum Peruviae, T. Haenke s.n. (HOLOTYPE: PR).

Distribution.—Mexico (Durango to Morelos and Veracruz; see map in Fryxell 1988, fig. 112), Venezuela, Colombia, Ecuador and Peru; 1400–3500 m elevation (cf. Brako & Zarucchi 1993).

Illustrations.—Fryxell (1992a, fig. 16; 1993, p. 166), Fuertes (1989, pls. 28, 29*, 30).

9. *Fuertesimalva pennellii* (Ulbrich) Fryxell, comb. nov.

Malvastrum pennellii Ulbrich, Notizbl. Bot. Gart. Mus. Berlin-Dahlem 11:524. 1932. TYPE: PERU. AREQUIPA: Arequipa, 2600–2700 m, 7–16 Apr 1925, F. W. Pennell 13206 (HOLOTYPE: F). Hill (1982, p. 398) notes that the holotype is missing at F. No isotypes are known, but one should be sought at PH, where Pennell's original herbarium is preserved.

Urocarpidium macrocarpum Krapov., Darwiniana 10:624. 1954. TYPE: PERU. LIMA: Canta, 2800–2900 m, 11–19 Jun 1925, F. W. Pennell 14589 (HOLOTYPE: US; ISOTYPES: GH, S).

Distribution.—Peru (Arequipa, Lima); 2500–2900 m elevation (0–3500 m fide Brako & Zarucchi 1993).

Illustrations.—Krapovickas (1954a, fig. 2J, fig. 3D-F, pl. 5).

10. *Fuertesimalva pentacocca* (Krapov.) Fryxell, comb. nov.

Urocarpidium pentacoccum Krapov., Bonplandia 3:69. 1970. TYPE: ARGENTINA. CATAMARCA. dep. Ambato, Sierra de Ambato, desde El Rodeo hacia el Cerro Manchado, 2900–3100 m, 23–25 Feb 1967, A. T. Hunziker 19223 (HOLOTYPE: CTES).

Distribution.—Argentina (Catamarca); 2900–3100 m elevation.

Illustrations.—Krapovickas (1970, fig. 3C-E).

11. *Fuertesimalva pentandra* (Schumann) Fryxell, comb. nov.

Malvastrum pentandrum Schumann, Martius Fl. Bras. 12(3):273. 1892. *Urocarpidium pentandrum* (Schumann) Krapov. Darwiniana 10:362. 1954. TYPE: ARGENTINA. CATAMARCA: Cuesta de Muschaca, F. Schickendantz 305 (LECTOTYPE, chosen by Krapovickas 1954a: B as photo F-9321; ISOLECTOTYPE: CORD).

Malvastrum catamarcense I.M. Johnst., Contr. Gray Herb. 70:75. 1924. TYPE: ARGENTINA. CATAMARCA: dep. Andalgalá, El Candado, 2 Sep 1916, P. Jörgensen 1388 (HOLOTYPE: GH; ISOTYPES: MO, US).

Distribution.—Argentina (Catamarca).

Illustrations.—Krapovickas (1954a, fig. 2I, pl. 8).

12. *Fuertesimalva peruviana* (L.) Fryxell, comb. nov.

Malva peruviana L., Sp. Pl. 688. 1753. *Malvastrum peruvianum* (L.) A. Gray, Bot. U.S. Explor. Exp. 1:146. 1854. *Malveopsis peruviana* (L.) O. Kuntze, Revis. Gen. Pl. 3(2):21. 1898. *Urocarpidium peruvianum* (L.) Krapov., Darwiniana 10:269. 1954. TYPE: Hortus Upsaliensis, seeds from Jussieu (HOLOTYPE: LINN-870.5; ISOTYPE: P-JU).

Malva matthewsii Turcz., Bull. Soc. Imp. Naturalistes Moscou 36:563. 1863. *Urocarpidium matthewsii* (Turcz.) Krapov., Darwiniana 10:616. 1954. TYPE: PERU. LIMA: Valley of Lima, A. Matthews 402 (ISOTYPE: K).

Distribution.—Coastal deserts of Peru and Chile; 100–600 m elevation (0–3000 m fide Brako & Zarucchi 1993).

Illustrations.—Díaz (1969, fig. 5), Krapovickas (1954a, fig. 2B–D, fig. 3A–C, pls. 2, 7).

13. *Fuertesimalva sanambrosiana* (D.M. Bates) Fryxell, comb. nov.

Urocarpidium sanambrosianum D.M. Bates, Gentes Herb. 9:383. 1965. TYPE: CHILE. ISLAS DESAVENTURADAS: San Ambrosio, above Punta Potalas, 250 m, 5 Dec 1960, G. Kuschel 7 (HOLOTYPE: K).

Distribution.—Chile (Islas Desaventuradas); “above 250 m” elevation.

Illustration.—Bates (1965, fig. 280).

14. *Fuertesimalva stipulata* (Fryxell) Fryxell, comb. nov.

Urocarpidium stipulatum Fryxell, Contr. Univ. Michigan Herb. 17:168. 1990. TYPE: PERU. CAJAMARCA: Las Cherimoyas, above San Benito (NE of Trujillo), 1400 m, 2 Apr 1987, C.L. Burandt, D.J. Keil & A. Sagástegui 2333 (HOLOTYPE: F; ISOTYPE: NY).

Distribution.—Peru (Cajamarca); 1400 m elevation.

Illustration.—Fryxell (1990, fig. 4).

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